



**Operations Monitoring Report
Fourth Quarter FY10**

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I. Executive Summary

A review of the fiscal year 2010 (FY10) Fourth Quarter performance and contract obligations between Constellation Energy Projects and Services (CEPS) and the Metropolitan Government of Nashville and Davidson County (Metro) is presented in this report by Thermal Engineering Group, Inc (TEG). The status of the available funds for all active capital construction and repair and improvement projects are also presented. For the fiscal year 2010, CEPS has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the Fourth Quarter FY10, the chilled water sendout increased by approximately 15.2% over the previous Fourth Quarter (FY09), and the sales increased by approximately 12.2%. There was a 28.5% increase in number of cooling degree days between the two quarters. The peak chilled water demand for the current quarter was 16,500 tons with a cooling load factor for the quarter of approximately 52%.

A comparison between the fiscal years FY09 and FY10 reveals only a slight increase (0.5%) in the chilled water sendout but a 3.2% decrease in sales. FY09 had considerably more cooling degree days than FY10, indicative of the greater chilled water sales in FY09. However, the peak cooling load in FY10 was 16,600 tons, approximately 3.1% greater than in FY09.

Due to a significant amount of rain received in Nashville on May 1st and 2nd, the Cumberland River spilled its banks and flooded the streets of downtown. The flood waters filled the Broadway Tunnel and many of the EDS vaults damaging the primary condensate return pumps in MH-18 and destroying a good portion of the insulation in the effected areas. As a result, the steam service to the DES was shut-down on the afternoon of May 2nd and remained off until May 7th. With the condensate pumps in MH-18 inoperable, the system condensate could not be returned to the EGF, thus steam system losses were exceptionally higher than in previous quarters.

The steam sendout for the current quarter decreased by 12.2% over the previous Fourth Quarter. Steam sales also decreased by approximately 17% over the previous Fourth Quarter. The current quarter saw a marked decrease in heating degree days (41.1% decrease) over the previous Fourth Quarter. Steam system losses were approximately 33.6% of the sendout which was approximately 12.8% higher than in the previous Fourth Quarter. The peak steam demand for the current quarter is 51,375 pounds per hour, which represents an approximate 32% decrease from the previous Fourth Quarter. The heating load factor for the quarter is approximately 44%.

For the fiscal year FY10, steam sendout decreased approximately 1.7% over the previous fiscal year (FY09). Steam sales also decreased over the same period by approximately 3.6%. However, the number heating degree days increased by approximately 12% from FY09 to FY10. The peak heating demand also decreased from 126,625 pph in FY09 to 121,500 pph in FY10.

The Energy Generating Facility (EGF) performance continues to surpass the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water and steam plant electric consumptions continue to perform considerably lower than the guaranteed levels. The steam plant fuel efficiency decreased marginally from the previous Fourth Quarter. The total water consumption for the steam and chilled water plants has increased approximately 18.4% from the previous Fourth Quarter due in large part to the damage to the system sustained in the flood. The chilled water EDS make-up has increased by approximately 70% with additional increases in all other water uses.

Although still satisfying the guaranteed values, the chiller and boiler plant electric conversions for the current fiscal year have resulted in a lower plant efficiency when compared to FY09. This trend could be indicative of the aging of the equipment. The water use for the boiler plant has increased by approximately 6% from FY09, but the chiller plant water use has decreased by approximately 8.7%.

Work continued on DES Capital and Repair & Improvement Projects during the Fourth Quarter of FY10 however some projects were delayed as a result of the flooding which occurred in May 2010. DES068, DES075 and DES078 were closed during the Fourth Quarter FY10. DES066, DES069 and DES079 were substantially completed during the Fourth Quarter FY10 with closeout expected in the First Quarter FY11. Design began on DES080 and DES081 during the quarter. Design was completed on DES077, and the bidding contractors were selected during the Fourth Quarter. Two projects were awarded during the Fourth Quarter FY10, DES067 and DES081. Work on MH-L, due to flood damage, was completed during the quarter. DES063 was placed on indefinite hold, and DES076 is on hold pending additional direction from the State. Repair and Improvements to the EDS continue as scheduled.

The current fiscal year system operating costs were \$17,591,619 at the end of the Fourth Quarter and the end of the fiscal year. This value represents approximately 83.9% of the total budgeted operating cost for FY10. The customer revenues from the sales of steam and chilled water for FY10 were \$15,416,142 which is approximately 83.3% of the budgeted amount. The difference between the operating costs and customer revenue, the Metro funding amount (MFA), is \$2,175,477 (89.0% of budget). These values include the project costs and reimbursements for the CEPS management fee and chemical treatment costs for May and June 2010.

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Attachment A: Metro Nashville District Energy System - Flood Event May 2010

II. Energy Distribution System Sales and Performance

This section of the report discusses and presents performance information regarding the operation of the EGF for the periods described. Charts and tabular data are also presented to provide a more detailed description of the actual EGF performance.

A. Chilled Water

1. Sales and Sendout

A comparison for the Fourth Quarter chilled water sales is shown in Figure 1. This data reflects an increase in sales for the current quarter over the same quarter of the previous fiscal year. A comparison of the two quarters reveals a 28.5% increase in the number of cooling degree days.

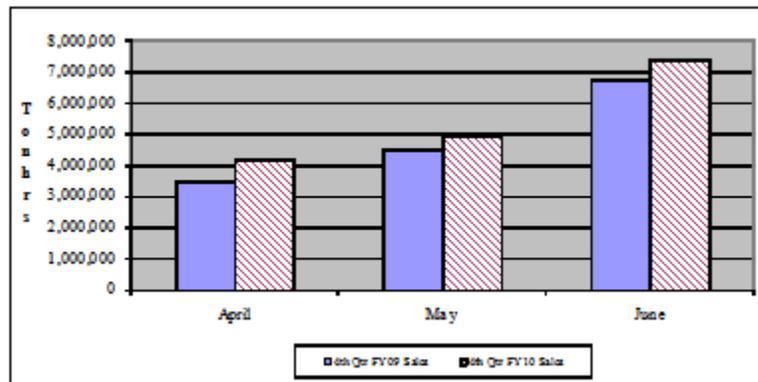


Figure 1. Fourth Quarter FY10 Chilled Water Sales Comparison

The peak chilled water demand for the current quarter is 16,500 tons. The cooling load factor for the current quarter, relative to sendout, is approximately 52% and is 11.7% greater than in the previous Fourth Quarter.

Even though the chilled water sales increased in the Fourth Quarter FY10, a comparison between the annual chilled water sales from FY09 to FY10 reveals a decrease in the sales by approximately 3.2%. This decrease in sales parallels a 12.5% decrease in the number of annual cooling degree days from FY09 to FY10. However, the peak chilled water load at the EGF was 3.1% higher in FY10 (16,600 tons) than in FY09 (16,100 tons).

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS. The number of cooling degree days per month are also tracked for comparison.

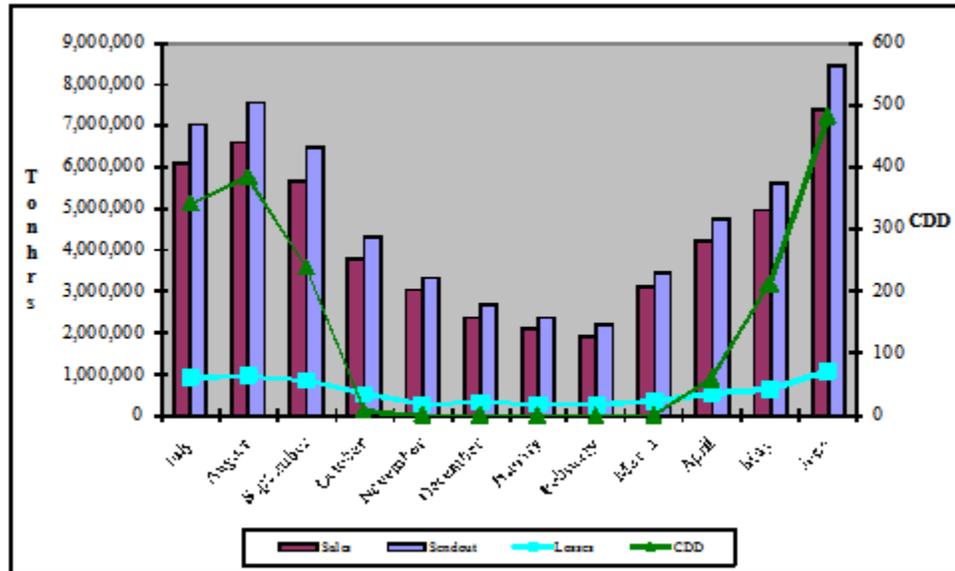


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for FY10

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the Fourth Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales. The energy loss is caused by a combination of the loss in the mass of chilled water and a net heat gain into the chilled water piping. The increase in supply temperature between the EGF and the customers is typically less than 1°F.

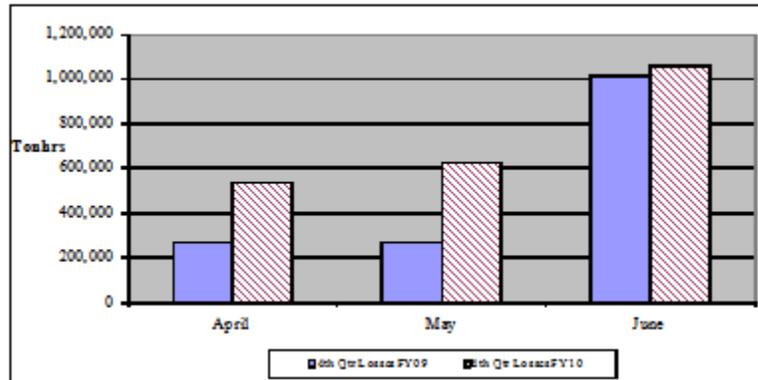


Figure 3. Chilled Water System Loss Comparison for the Fourth Quarter FY10

The EDS make-up increased by approximately 70% over the previous Fourth Quarter due to a leak in the system and due to the damage caused by the flood in May. The total energy losses increased by approximately 42.2%. The make-up to the cooling towers increased by approximately 16.2%. The number of cycles of concentration in the condensing water circuit decreased by 4.5% in the Fourth Quarter over the previous Fourth Quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

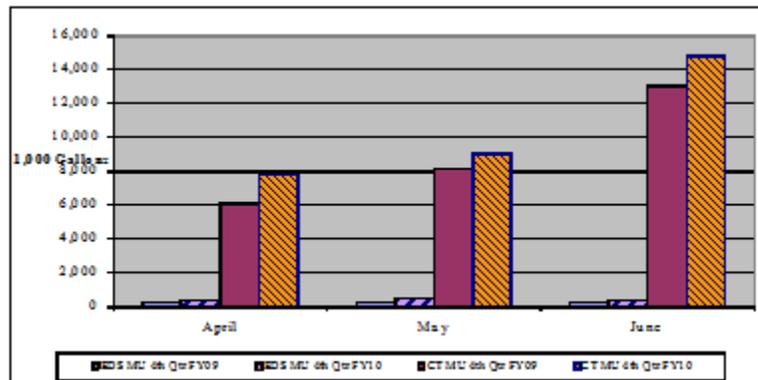


Figure 4. Chilled Water System City Water Usage Comparison

The increase in water usage for the chilled water system is largely due to the increase in warmer and more humid weather experienced this year. This increase in ambient temperature is reflected in the increase in the number of cooling degree days for the Fourth Quarter by 28.5% over the previous Fourth Quarter. Higher ambient temperatures and relative humidity cause an increase the amount of water used by the

cooling towers due to the increase in the required amount of evaporation. The cooling tower use represents 96.4% of all city water make-up to the chilled water system.

A marked increase (39.3%) in the annual chilled water system energy losses occurred between FY09 and FY10. This increase in energy loss is followed by a 60.4% increase in the annual amount of EDS make-up. The increase in EDS make-up was due to a system leak that appears to have been increasing in magnitude each month from the beginning of the this fiscal year and to a leak that occurred as a result of the flood in May 2010. Both of these issues have been resolved to date, and the amount of chilled water system losses and EDS make-up should continue to decline over the next fiscal year (FY11).

Overall, the total annual water use for the chilled water system decreased approximately 8.7% over FY09. An approximate 10% decrease in the amount of city water required for the cooling towers in FY10 contributed largely to the overall decrease in chilled water system make-up. The primary reason for this decrease in cooling tower make-up is the significant decrease in cooling degree days (12.5%) during the year.

3. Performance

The performance of the chilled water aspect of the EGF is presented by the following two charts, Figures 5 and 6, for FY10. Under the management of CEPS, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

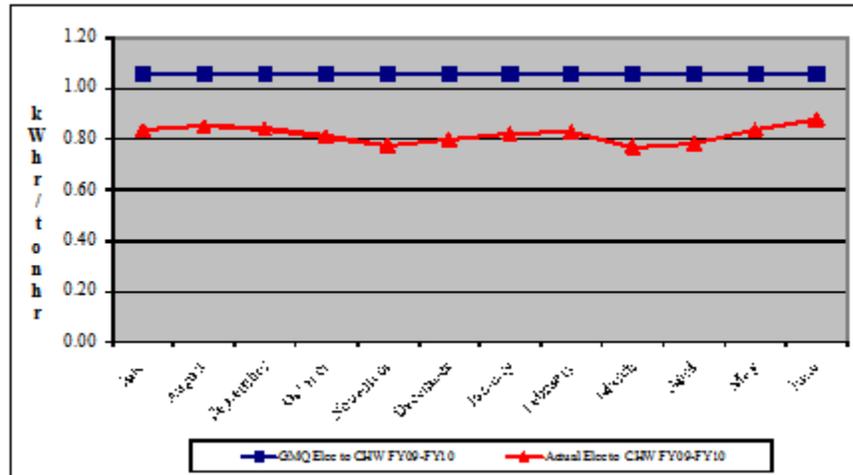


Figure 5. Chiller Plant Performance Guarantee Comparison for FY10

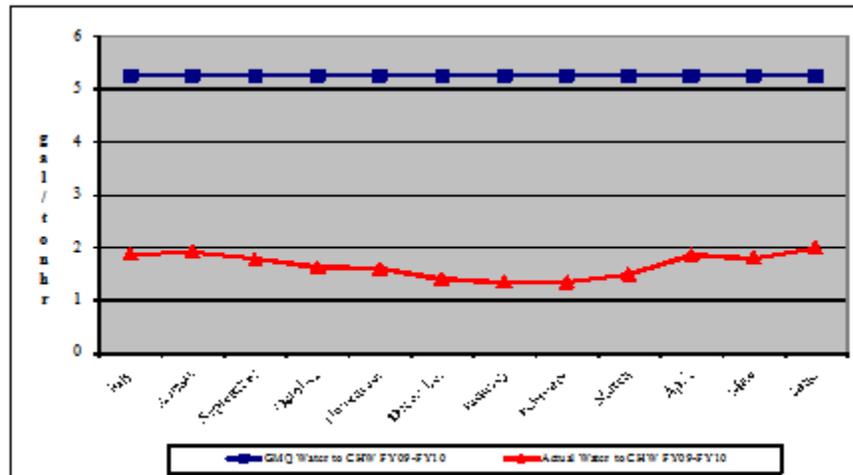


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for FY10

The chilled water allocation of the electric consumption falls under the GMQ limit of 1.055 kWhr per tonhr for the current quarter, and no excursion is reported for the current fiscal year. The chiller plant electric usage for the current quarter increased approximately 15.0% over the Fourth Quarter for FY09. The actual electric conversion factor increased by 2.5% over the previous Fourth Quarter.

The annual chiller plant electric usage decreased by approximately 2.3% this year over the previous fiscal year. A similar decrease in chilled water sales are also noted.

However, the chiller plant electric conversion factor increased by less than 1% from 0.819 kWhr per tonhr in FY09 to 0.827 kWhr per tonhr in FY10.

The actual chilled water plant water conversion factor is approximately 4.7% greater than in the previous Fourth Quarter. The total consumption of city water for the chiller plant for the current quarter is approximately 17.5% greater than that for the previous Fourth Quarter.

For the current fiscal year, the water conversion factor decreased by 5.6% of the previous fiscal year. The annual amount of city water for the chiller plant decreased by 8.7% from FY09. As noted previously, this decrease in city water usage is due to a decrease in chilled water sales and cooling degree days over the previous fiscal year.

B. Steam

The May 2010 flood caused significant damage to a number of DES customers and to the EDS. The Broadway Tunnel was submerged for several days, causing significant damage to the insulation throughout and the condensate return pumps located in MH-18. These pumps had to be completely rebuilt, and while they were down, no condensate could be returned to the EGF. Insulation at various system vaults were also damaged, causing an increase in the amount of heat loss at these points. Until the system insulation has been fully repaired, an increase in the system losses and city water make-up may be expected. The decrease in steam sales and an increase in system losses are largely due to the duration of the steam system shut down (May 2nd through 7th) and the flood related damage.

1. Sales and Sendout

The steam sendout decreased by approximately 12.2% over the previous Fourth Quarter (FY09), and the sales decreased by approximately 16.9%. The steam system losses decreased marginally. The number of heating degree days decreased by 41.1% over the previous Fourth Quarter. A comparison for the Fourth Quarter steam sales is shown in Figure 7.

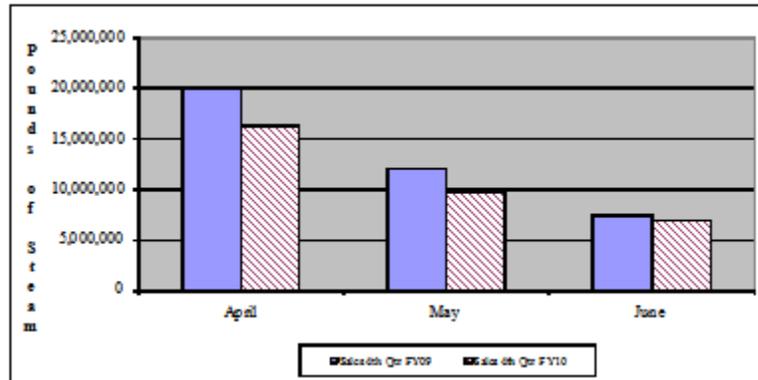


Figure 7. Steam Sales Comparison for the Fourth Quarter FY10

The peak steam demand for the current quarter is 51,375 pph, which reflects an approximately 32% decrease in the peak steam production over the previous Fourth Quarter. The heating load factor for the current quarter, relative to sendout, is approximately 44% and is 29% greater than in the previous Fourth Quarter.

The annual steam sales also decreased in FY10 from FY09 by 3.8%. This decrease occurred despite a 12% increase in the number of heating degree days this fiscal year compared to the previous fiscal year. The decrease in sales could be related to energy conservation measures implemented by the steam customers since an increase in the number of heating degree days would suggest an increase in steam sales. Similarly, the peak steam demand for FY10 (121,500 pph) is 4.1% lower than the recorded value from FY09 (126,625 pph).

Figure 8 shows the steam sales, sendout and losses for the previous twelve months (FY10). The losses on this figure are defined as the difference in pounds per month between the recorded sendout and sales values and represent the total mass loss in the EDS between the EGF and the customer meters.

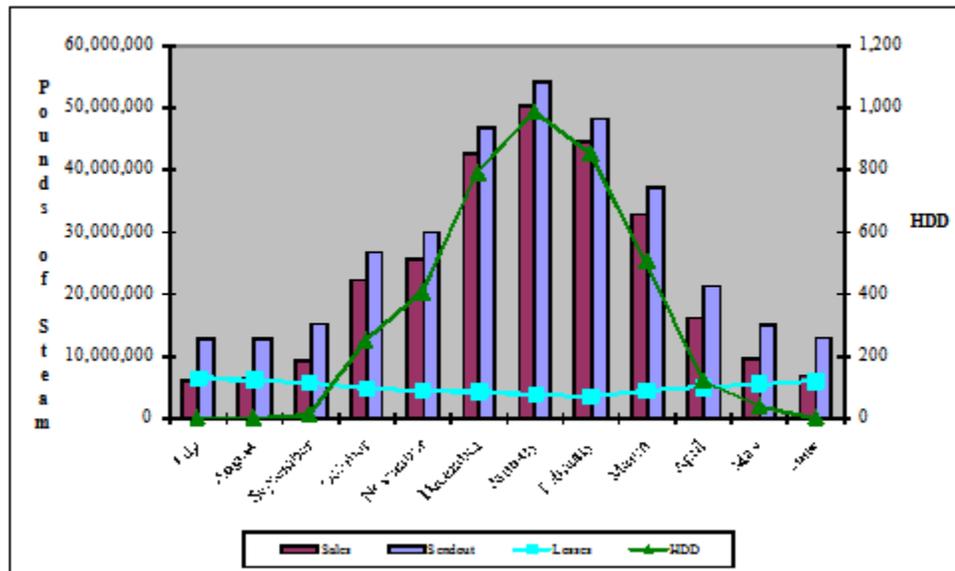


Figure 8. Steam Sales, Sendout, Losses and HDD for FY10

2. Losses

A comparison of the total steam mass losses in the EDS for the Fourth Quarter is shown in Figure 9. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing cause of these losses. The total losses for the current quarter are approximately the same as in FY09.

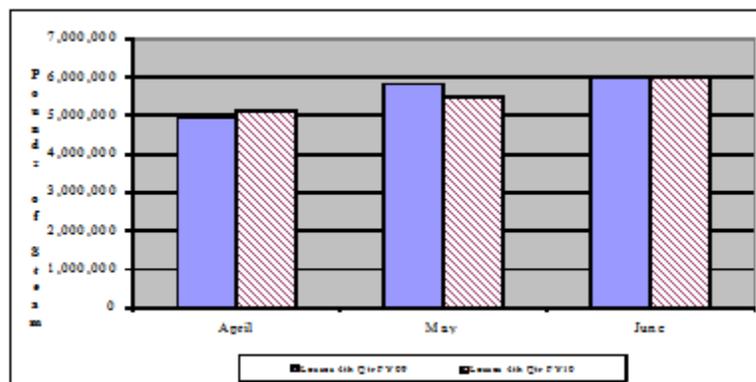


Figure 9. Fourth Quarter FY10 Steam System Losses

The amount of city water make-up (MU) to the steam system consists of the loss in mass between the EGF and the customers, in the condensate return from the customers to the EGF and losses at the EGF. This data is shown in the comparison of Fourth Quarter data in Figure 10. Figure 10 depicts an increase in city water make-up to the steam system of approximately 26.6% for the current quarter. This significant increase in city water make-up is due to the 6% total condensate return for the month of May. Due to damage to the system caused by the flood waters on May 1 through May 3, condensate could not be return to the EGF for the vast majority of the month.

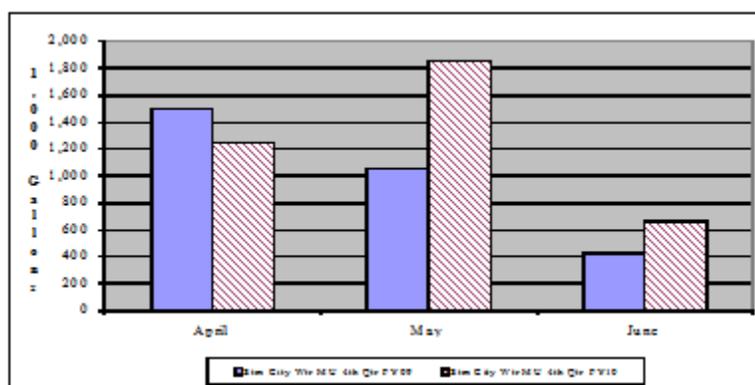


Figure 10. Fourth Quarter Steam System City Water Make-up Comparison

For the fiscal year, the city water make-up increased by 6% over the previous fiscal year. Although partly due to damage caused by the flood, the increase in make-up occurred during a period of decreased sendout (1.7%), decreased sales (3.6%) and decreased annual losses (3.6%) but with an increase in the heating degree days (12%).

3. Performance

The performance of the steam system aspect of the EGF is presented by the following three charts, Figures 11, 12 and 13. Under the management of CEPS, the System Performance Guarantee levels as described in the ARMA are being achieved satisfactorily except for the excursions in the electric consumption during the summer months.

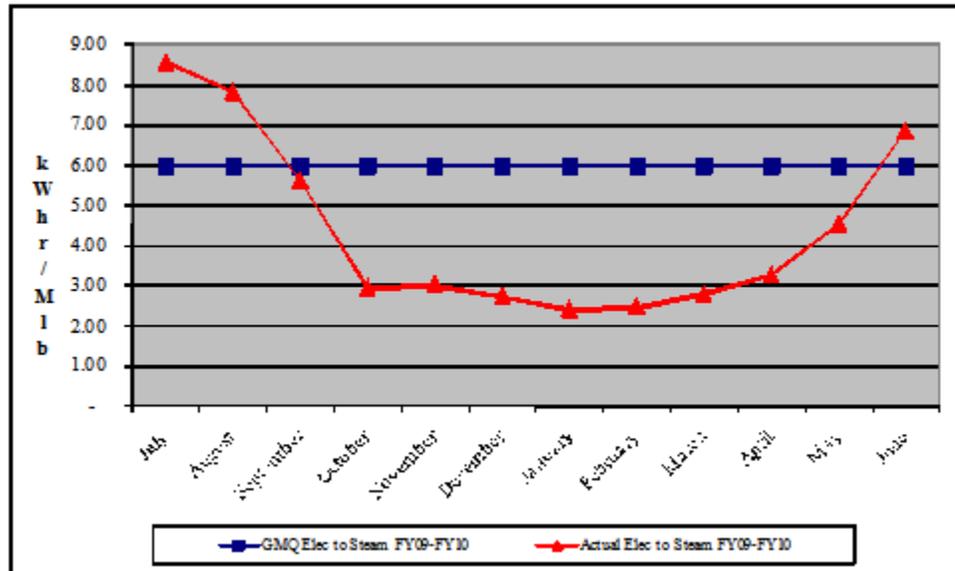


Figure 11. Steam Plant Electric Consumption Performance Guarantee for FY10

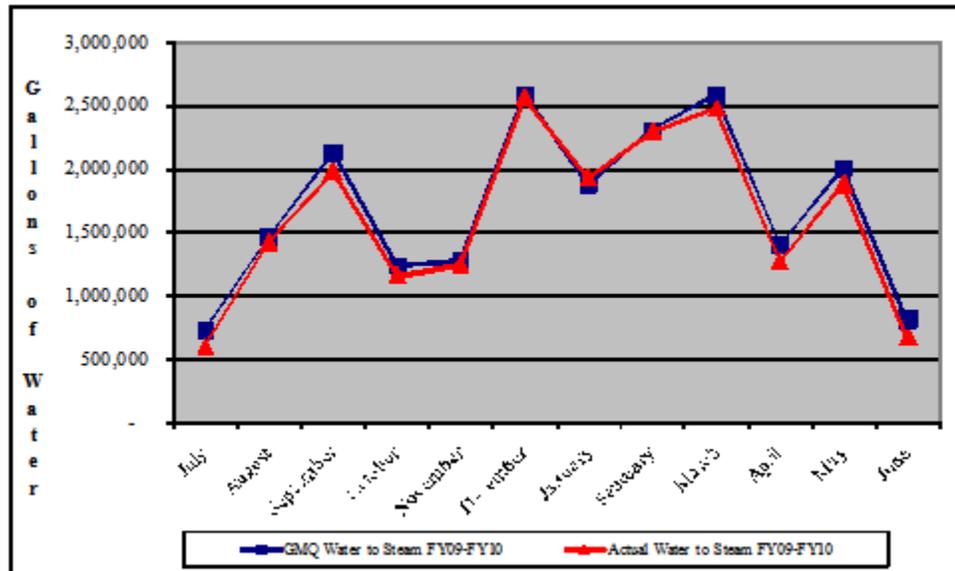


Figure 12. Steam Plant Water Consumption Performance Guarantee for FY10

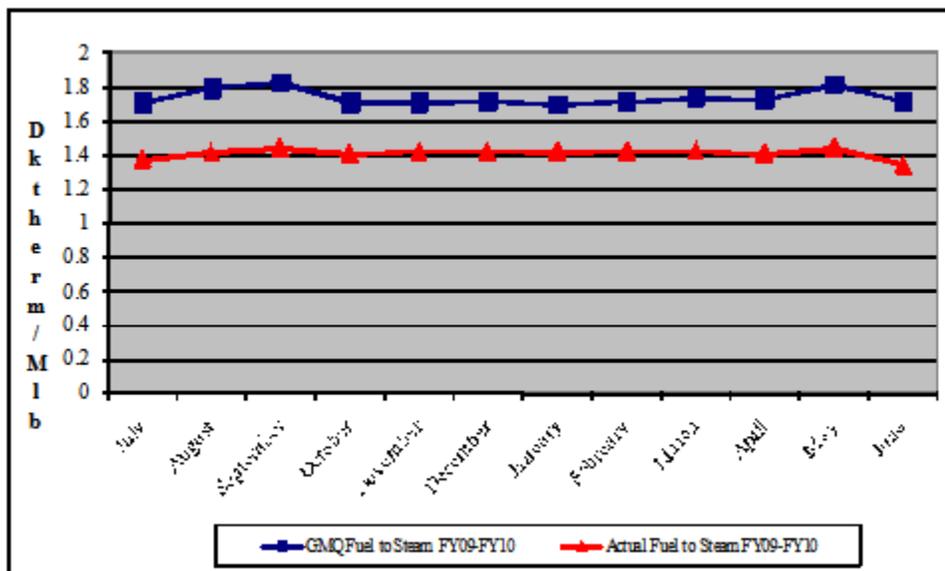


Figure 13. Steam Plant Fuel Consumption Performance Guarantee for FY10

Even though the steam electric conversion factor exceeded the contract guarantee limit for June, the average value was within the limit for the current quarter. The current quarter also experienced a 9.4% decrease in the steam plant electric consumption while experiencing a 9.1% increase in the electric conversion factor. The steam plant realized an increase of approximately 2% in the annual electric consumption as compared to the previous fiscal year, but saw a 5.8% increase in the electric conversion factor over the previous fiscal year.

The water consumption for the steam plant increased 26.6% this quarter as compared to the previous Fourth Quarter. However, the annual consumption of city water make-up for FY10 increased only 6.1% when compared to FY09. These changes occurred during a fiscal year in which the amount of condensate return to the EGF decreased 5.4% over FY09.

The fuel consumption per unit of steam sales is relatively constant throughout the year and when compared to the historic data. The decrease in boiler plant fuel efficiency decreased only marginally for the current quarter and for the fiscal year.

C. Contract Guarantee Performance

The production and sales performance for the EGF and EDS are summarized in Table 1 for the current quarter and for the fiscal year. Additional parameters, such as cooling tower blowdown and peak demands are listed in this table, as well. Table 2 presents the Annual and

Fourth Quarter comparison of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. Annual and Fourth Quarter FY10 Production, Sales and Consumption Summary

Item	Unit	Fourth Quarter FY10	Fourth Quarter FY09	*Percent Difference	Total Year FY10	Total Year FY09	*Percent Difference
	days	91	91	0.00%	365	365	0.00%
Total Electric Use	kWhrs	14,066,248	12,264,289	14.69%	43,278,196	44,263,344	-2.23%
Chilled Water	kWhrs	13,922,278	12,105,405	15.01%	42,397,725	43,399,970	-2.31%
Steam	kWhrs	143,970	158,884	-9.39%	880,471	863,374	1.98%
Total Water Use	kgal	36,492	30,831	18.36%	113,332	121,136	-6.44%
Total Chilled Water	kgal	32,717	27,848	17.48%	94,064	102,967	-8.65%
EDS Make-up	kgal	1,175	691	70.04%	4,095	2,553	60.40%
Cooling Towers	kgal	31,542	27,157	16.15%	89,969	100,412	-10.40%
Calc CT Evaporation	kgal	26,980	23,382	15.39%	76,837	85,432	-10.06%
CT Blowdown	kgal	4,562	3,775	20.85%	13,132	14,980	-12.34%
Calc # Cycles		5.91	6.19	-4.52%	5.85	5.70	2.60%
Steam	kgal	3,775	2,983	26.55%	19,268	18,169	6.05%
Total Fuel Use	mmBTU	69,128	78,123	-11.51%	472,158	477,760	-1.17%
Natural Gas	mmBTU	69,128	78,057	-11.44%	471,490	477,432	-1.24%
Propane	mmBTU	0	66	N/A	668	328	103.66%
Condensate Return	kgal	2,384	3,904	-38.93%	23,131	24,884	-7.05%
	lbs	19,444,362	31,841,254	-38.93%	188,651,336	202,953,891	-7.05%
Avg Temp	°F	172.3	164.3	4.87%	166.7	160.6	3.79%
Sendout							
Chilled Water	tonhrs	18,790,200	16,315,600	15.17%	58,313,100	58,032,400	0.48%
Steam	lbs	49,341,000	56,175,000	-12.17%	333,071,000	338,984,000	-1.74%
Peak CHW Demand	tons	16,500	16,000	3.13%	16,600	16,100	3.11%
Peak Steam Demand	lb/hr	51,375	75,500	-31.95%	121,500	126,625	-4.05%
CHW LF		52.14%	46.69%	11.68%	40.10%	41.15%	-2.54%
Steam LF		43.97%	34.07%	29.08%	31.29%	30.56%	2.40%
Sales							
Chilled Water	tonhrs	16,567,774	14,763,928	12.22%	51,271,619	52,976,335	-3.22%
Steam	lbs	32,743,834	39,422,520	-16.94%	272,447,630	282,523,746	-3.57%
Losses							
Chilled Water	tonhrs	2,222,426	1,551,672	43.23%	7,041,481	5,056,065	39.27%
Steam	lbs	16,597,166	16,752,480	-0.93%	60,893,370	56,460,254	7.85%
		33.64%	29.82%	12.80%			
Degree Days							
CDD		749	583	28.47%	1,718	1,963	-12.48%
HDD		159	270	-41.11%	3,956	3,531	12.04%

*positive percent difference values imply an increase from FY09 to FY10

Table 2. Annual and Fourth Quarter FY10 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	Fourth Quarter FY10	Fourth Quarter FY09	*Percent Difference	Total Year FY09	Total Year FY08	*Percent Difference
Steam							
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00		6.00	6.00	
Electric Conversion	kWhr/Mlb	4.40	4.03	9.10%	3.23	3.06	5.75%
GMQ Plant Efficiency	Dth/Mlb	1.755	1.726		1.741	1.733	
Plant Efficiency	Dth/Mlb	1.401	1.391	0.74%	1.418	1.409	0.58%
Actual %CR		39.41%	56.68%	-30.48%	56.64%	59.87%	-5.40%
Avg CR Temp	°F	172	164	4.87%	167	161	3.79%
GMQ Water Conversion	gal	4,215,518	3,431,133		20,363,618	19,180,665	
Water Conversion	gal	3,812,750	3,012,830	26.55%	19,460,680	18,350,690	6.05%
Chilled Water							
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055		1.055	1.055	
Electric Conversion	kWhr/tonhr	0.840	0.820	2.49%	0.827	0.819	0.94%
GMQ Water Conversion	gal/tonhr	5.25	5.25		5.25	5.25	
Water Conversion	gal/tonhr	1.97	1.89	4.69%	1.83	1.94	-5.61%

*positive percent difference values imply an increase from FY09 to FY10

D. Operating Costs

The operating costs for the DES include the management fee to CEPS, debt service payments on the bonds and engineering and administration costs. Some of these costs are fixed, implying that they do not vary depending on the production or sales of steam or chilled water. The variable costs are dependent on the amounts of steam and chilled water produced and sold to the customers and include the utility and chemical treatment costs. The vast majority of the costs incurred for the operation of the DES are passed onto the customers in the form of the demand charges (fixed costs) and energy charges (variable costs). A summary of the total operating costs for the fiscal year FY10 are shown in Table 3.

The revenues shown reflect the charges to the customers for their respective steam and chilled water service. The difference between the total costs and revenues from the customers is the shortfall that must be paid by Metro. The shortfall exists, in part, due to the remaining capacity at the EGF that was included in the original construction and remains unsold. This capacity is available for potential future customers.

The current fiscal year system operating costs were \$17,591,619. This value represents approximately 83.9% of the total budgeted operating cost for FY10. The customer revenues from the sales of steam and chilled water for FY10 were \$15,416,142 which is approximately 83.3% of the budgeted amount. The difference between the operating costs and customer revenue, the Metro funding amount (MFA), is approximately \$2,175,477. This value is

approximately 89.0% of budget. At the time of this report, the CEPS invoices for their management fees and chemical treatment for May and June 2010, totaling \$729,478 had been issued but not paid by Metro. These values are included in the following table to more accurately reflect the FY10 costs.

Table 3. FY10 Operating Expenses

Item	FY10 Budget	Total Expenses to Date (4th Qtr)	Percent of FY10 Budget
FOC: Basic	\$ 3,976,200	\$ 3,852,170	96.88%
FOC: 9th Chiller	\$ 37,200	\$ 36,095	97.03%
FOC: Change Order 6A	\$ 73,400	\$ 71,263	97.09%
FOC: Change Order 6B	\$ 64,300	\$ 62,388	97.03%
Chemicals	\$ 161,200	\$ 148,121	91.89%
Engineering	\$ 26,200	\$ 11,458	43.73%
Insurance	\$ 43,700	\$ 27,723	63.44%
Marketing: CEPS Sales Activity	\$ 9,800	\$ -	0.00%
Metro Marketing	\$ 35,000	\$ 21,025	60.07%
Incentive Payments	\$ -	\$ -	n.a.
Project Administration	\$ 24,000	\$ -	0.00%
Metro Incremental Cost	\$ 526,400	\$ 327,732	62.26%
FEA: Steam	\$ -	\$ 130,802	n.a.
FEA: Chilled Water	\$ -	\$ 365,307	n.a.
ARFA	\$ -	\$ 55,947	n.a.
Metro Credit	\$ -	\$ (711,957)	n.a.
Water/Sewer	\$ 689,600	\$ 375,016	54.38%
Natural Gas/Propane	\$ 4,692,900	\$ 3,024,226	64.44%
Electricity	\$ 5,034,100	\$ 3,976,234	78.99%
EDS Repair & Improvement	\$ 176,500	\$ 211,592	119.88%
EDS Surcharge	\$ 70,600	\$ -	0.00%
Sub-total Operations	\$ 15,641,100	\$ 11,985,142	76.63%
2002 Bonds	\$ 4,362,900	\$ 4,362,852	100.00%
2005 Bonds	\$ 627,600	\$ 627,588	100.00%
FY07 Projects	\$ 227,800	\$ 336,225	147.60%
FY08 Projects	\$ 220,500	\$ 336,225	152.48%
Debt Service Interest Revenue	\$ (123,700)	\$ (56,413)	45.60%
Oper. Reserve Funding Deposit	\$ -	\$ -	n.a.
Sub-total Debt Service	\$ 5,315,100	\$ 5,606,477	105.48%
Total Expenses	\$ 20,956,200	\$ 17,591,619	83.94%
Customer Revenues	\$ 18,512,100	\$ 15,416,142	83.28%
Total Metro Funding Amount	\$ 2,444,100	\$ 2,175,477	89.01%

The DES serves 26 customers and 40 buildings in downtown Nashville. These customers are divided into three categories: 1) Private customers who privately own their buildings, 2) State of TN owned buildings and 3) Metro owned buildings. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties and any unpaid balances.

The previous tenant in the building at 401 Union Street is no longer a customer due to an abandonment of the premises. This building is currently owned by Metro but remains unoccupied and does not utilize any steam or chilled water. The former tenant and Metro have outstanding balances to DES that have not been collected to date. The revenue budgeted for this customer for FY10 will not be collected, thus the fixed cost component anticipated from this customer will not be paid, resulting in a potential increase in the MFA.

Table 4. FY10 Customer Revenues to the End of the Fourth Quarter

Building	Chilled Water			Steam		
	Total Cost	Consumption (tonhrs/yr)	Unit Cost (\$/tonhr)	Total Cost	Consumption (Mlb/yr)	Unit Cost (\$/Mlb)
Private Customers	\$ 3,479,550.69	17,275,353	\$ 0.2014	\$ 1,665,963.25	79,273	\$ 21.015
State Government	\$ 3,256,686.24	16,751,676	\$ 0.1944	\$ 2,271,242.33	104,152	\$ 21.807
Metro Government	\$ 3,017,483.83	17,245,590	\$ 0.1750	\$ 1,969,810.31	89,023	\$ 22.127
New Customers	\$ 1,149,103.01	5,695,616	\$ 0.2018	\$ 255,358.06	12,270	\$ 20.811
Total	\$ 9,753,720.76	51,272,619	\$ 0.1902	\$ 5,907,015.89	272,448	\$ 21.681

Total Revenue \$ 15,660,736.65
 True-up and Adjustments \$ (2,514,511.50)
 Net Revenue \$ 13,146,225.15

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CEPS for FY10. Communication between TEG and CEPS continues to be excellent, and CEPS has reported and managed all EGF operations satisfactorily and according to the ARMA with no contract violations.

A. Reliability

The principle issues surrounding the reliable operation of the EGF relates to the ability to operate without significant interruption, exclusive of planned outages, and disruption of service to the customers. The following disruptions in service occurred during the quarter.

- A flame scanner failure on boiler #2 caused the unit to trip on the afternoon of April 23 causing the steam pressure to drop to 110 psig within 45 minutes. The problem was remedied and the steam pressure was back to normal within the following hour.
- The steam system was shut-down from the afternoon of May 2 until the morning of May 8 due to the submergence of a portion of the system by the flood waters of the Cumberland River and the damage caused by it. The chilled water system remained on-line during and after the flood.

- An additional outage occurred on May 26 for approximately 23 hours so that repairs could be made to the steam anchor in MH-L. These repairs were necessary due to apparent damage caused to the steam system by the flood.
- The city water make-up to the chilled water system increased significantly after the flood. A leak was discovered within the Schermerhorn Symphony on May 6. This building was isolated until repairs could be made. The Symphony building sustained significant damage as a result of the May 2010 flood.
- An additional leak was found on the chilled water system at a drain valve near the Woodland Street bridge on the service to LP Field. This valve was replaced on May 17.
- An electric problem during a storm on June 17 caused a trip on the chilled water pumps which subsequently caused the chillers to trip due to low flow. The system was immediately restarted.

B. Efficiency

The operation of the EGF satisfied the guaranteed levels for all commodity usage during the quarter. There were no significant excursions above the guaranteed levels for the Fourth Quarter. A more detailed discussion of the contract guarantee performance was presented previously in this report.

C. Environment, Health and Safety

No environmental violations were reported during the quarter. There were no employees reported to be on light duty and were no reported lost-time accidents during the quarter.

Corporate safety and security audits were performed by Constellation in April.

Monthly safety meetings were conducted by HazMat, Inc. and through CEPS personnel.

D. Personnel

The EGF currently has twenty-five full time employees. Of the current number of employees, nineteen were previously employed by Nashville Thermal Transfer Corporation. There were no personnel changes during the quarter.

E. Training

Staff training for this quarter consisted of the Health and Safety training discussed previously.

F. Water Treatment

The water treatment program consists of regular testing and monitoring of the water chemistry in the steam, chilled water and condensing water systems. Chemicals are added to control the water hardness, chlorine levels and biologicals. Remote testing of the condensate at the AA Birch, Tennessee Tower and the Andrew Jackson also occurs regularly to monitor the concentration and distribution of the steam system chemicals.

- Steam System
 - The steam and condensate system had excellent chemistry for most of the quarter with a few exceptions. The condensate return was relatively low for the quarter due to contamination from several customers in April and from the damage caused by the flood to the condensate return pumps in MH-18 in May.
- Condensing Water System
 - The conductivity of the condensing water continues to be normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - The system control and chemistry continues to be excellent.

G. Maintenance and EGF Repairs

CEPS continues to report on the numerous routine maintenance and preventive maintenance activities performed on the EGF primary and ancillary equipment. The principle items are discussed herein as they relate to the repair, maintenance or replacement of equipment or devices at the facility and are not considered extraordinary. The cost for these items is included as part of the FOCs.

- Repairs were made the fan shaft bearings to cooling tower #2 in April.
- The motor for the condensing water pump #4 was sent out for repairs during April and re-installed in June.
- Repairs were made to the BL 1544 chemical pump in April.
- The mud drum blowdown valves for boiler #1 were repaired during the quarter.
- A refrigerant leak on chiller #9A was repaired in May.
- An emergency shower was installed on the mezzanine level in June.
- A new air compressor was installed on the fire suppression system.
- The bearings and oil seals to boiler feedwater pump #1 were replaced in June.
- The vibration switch to cooling tower #16 was replaced in June.

- Other minor repairs and maintenance were made during the quarter and are listed in the monthly reports issued by CEPS.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on June 22, 2010, by Kevin Jacobs, P.E. of TEG. This review involved a tour of the facility with the primary points of interest and concern noted herein.

- The operator log book indicated no recurring issues.
- The head for de-aerator #1 was open for cleaning and inspection.
- Boilers #2 and 4 had their steam and mud drums and furnaces open for inspection.
- Numerous minor cracks in the outside concrete walls remain. No additional work has been performed on these cracks. No action is required at this time.

IV. Capital Projects

The Capital Projects discussed in this section are those projects funded through the issuance of bonds by Metro. Costs for these projects will be paid from funds already appropriated. New projects are anticipated for the 2010 Bond Projects, and some of these projects have been designed and bid. Due to the cost of the Tunnel Rock Rehabilitation project, two FY10 projects have been deferred until FY11.

The status of the projects are discussed, and the project cost-to-date and bond balances are also presented.

A. Fourth Quarter FY10 Open Projects

The following projects remained open at the end of the Fourth Quarter of FY10.

1. DES033 - Manhole Lid and Ring Replacement/Restoration

This project relates to the repair and replacement of manhole lids and rings whenever Metro Public Works performs street re-paving. Work took place on Manhole B2 during the Fourth Quarter FY10. However due to delays caused by the flood of May 2010, completion was not achieved during the same quarter. This project will remain open.

2. DES048 - Tunnel Lighting & Electrical Upgrades Phase III

The first two phases of this project have been completed, and the final phase is budgeted and scheduled to be replaced during FY10. However, the repair to the

tunnel structure needs to be completed prior to the lighting and electrical upgrades. Therefore, the completion of this project is on hold until DES067 is completed. Due to the flood in May 2010, the start of DES 067 has been delayed until the First Quarter FY11.

3. DES060 - Manhole & Tunnel Insulation Repair (Revised from DES050 for FY10)

Manhole B2 was being re-insulated when the May 2010 flood occurred, and the assessment of potential damage to the existing and new insulation in this vault is still ongoing. This work will resume once this assessment is complete. The work associated with this project will be ongoing as required.

4. DES062 - Steam and Condensate Replacement to 120 2nd Avenue North

The tie-in of the steam and condensate service took place during the Third Quarter FY10. In addition, the restoration of the Riverfront Park sidewalk and additional work in Manhole K, including insulation, was completed during the Third Quarter FY10. Final closeout of this project is pending acceptance by Metro Parks of the brickwork performed in the sidewalk area. This project should be closed during the First Quarter FY11.

5. DES063 - Manhole A, B & M Sump Pump Installation

Due to the unanticipated high prices received from contractors, this project does not appear financially viable, at this time, and is put on indefinite hold.

6. DES066 - First Avenue Manhole Retirement

This work has been completed and awaits review by TEG. It is anticipated that the review of this work and the close out of this project will take place during the First Quarter FY11.

7. DES067 - EDS Tunnel Structural (Rock) Rehabilitation

This project was bid during the Third Quarter FY10. A formal award was made during the Fourth Quarter FY10 and mobilization was planned for the same quarter. This mobilization was delayed due to the flood in May 2010. Mobilization is planned for the early part of the First Quarter FY11.

8. DES068 - Manhole 10 Structural Rehabilitation

Construction began and was completed during the Fourth Quarter FY10 and the project was closed during the same quarter.

9. DES069 - Wildhorse Tempering Station Removal & Relocation to the Municipal Auditorium

Design drawings were developed for this project, and a contractor was selected for this work during the Third Quarter FY10. Construction began on this project during the Fourth Quarter FY10. However due to the flood in May 2010, some delays in the project work occurred. Substantial completion was achieved at the end of the Fourth Quarter FY10, and it is anticipated that completion of the project and closeout will occur during the First Quarter FY11.

10. DES073 - MH 18 Platform Extension & Sump Pump Control Modifications

Due to the anticipated start of DES067 and the desire to avoid having two projects take place in the same location, at the same time, it is anticipated that this project will be bid and awarded after the completion of DES067.

11. DES075 - 2010 Chilled Water Outage

This project was closed during the Fourth Quarter FY10.

12. DES076 - Manhole S4A Rehabilitation

Preliminary design was completed for the repairs during the Third Quarter FY10, and the State had originally requested that repairs not begin until June 2010. Some of the State's fiber optic communications cabling passes through this manhole. During final review of the repair drawings, the State voiced extreme concern about the absence of a secondary communication link if the fiber optics in this manhole were damaged during the rehabilitation of this manhole. Therefore, the bidding of this project has been delayed.

13. DES077 - Music City Center Service Connection

The final engineering was completed on this project and issued for bid on May 21, 2010. Bell Clark was retained as the construction manager by Metro DES and assisted TEG and DES in securing bids from various civil and mechanical contractors. The installing contractors and pre-insulated pipe supplier were selected

during the quarter, but contracts were not finalized at the end of FY10. Construction of the new service lines and vaults is anticipated to begin in the First Quarter FY11.

14. DES078 - J. K. Polk Dripleg Installation

This project was closed during the Fourth Quarter FY10.

15. DES079 - TN Towers Gold Parking Lot Pavement Repair

Depressions have developed in the Gold Parking lot of the Tennessee Towers in areas which were disturbed during the implementation of DES029. A site review was held, and a contractor was selected to repair the pavement. This work took place during the Fourth Quarter FY10, and it is anticipated that this project will be closed out during the First Quarter of FY11.

16. DES080 - Misc. Manhole & Tunnel Safety Repairs

Through the ongoing review of the manholes and tunnels, some safety items have been noted that require attention. This project was established to address these items.

Manholes 16A, 22B, D2 and D3 require the addition of some safety related items such as handrails, ladder cages etc. Design was started on the addition of these items in these manholes during the Fourth Quarter FY10. It is anticipated that the design and bid for this project will be completed during the First Quarter FY11.

17. DES081 - Flood Related Repairs

As a result of the flooding in May 2010, some damage occurred to the EDS. This project number was established to address the repair of portions of this damage.

Specifically, damage resulted in Manhole L located at Riverfront Park due to the required shut down and subsequent cooling of the EDS. This damage is related to an 18" slip type expansion joint which became bound when the system was re-energized after the flood. The repairs include the removal and replacement of one expansion joint and the removal of a second expansion joint with the placement of ball type expansion devices. Repairs for this work were designed, bid and awarded during the Fourth Quarter FY10. Due to event conflicts at Riverfront Park the work for this project will not begin until the First Quarter FY11. Attachment A provides a summary of the system damage caused by the flood and the required repair work.

Costs are currently under review by FEMA with an anticipated 90% reimbursement for those costs not covered under Metro's insurance plan. Remaining costs will be cover by the 2010 bonds.

B. Fourth Quarter FY10 Closed Projects

Three projects were closed during the Fourth Quarter FY10: DES 068, DES 075 and DES 078.

C. Capital Projects Budget

The following table summarizes the costs and remaining balance of the DES capital projects based on reported expenditures at the end of the Fourth Quarter FY10. Open projects or completed projects that require some additional management are shown. Projects that were closed to date are shown with a gray highlight. Since the remaining funds from the 2002A bond have been consumed, the previous projects associated with this bond are no longer noted in the following table. The 2008 Bond fund is also depleted and the projects associated with it are also not shown.

Table 5. Fourth Quarter FY10 Capital Projects Budget Summary

DES Project #	Description	Total Budget	FY10 Spending to Date	Total Spent to Date	Remaining Balance
2005B Bond Projects					
DES064	Spring09 Steam Shutdown	\$ -	\$ 950.19	\$ 950.19	\$ (950.19)
DES063	Sump Pump/MH B and M	\$ -	\$ 5,193.68	\$ 5,193.68	\$ (5,193.68)
DES074	NES CIAC Payment	\$ -	\$ 104,900.37	\$ 104,900.37	\$ (104,900.37)
DES056	Citizen's Plaza Steam and Condensate	\$ -	\$ 251.93	\$ 251.93	\$ (251.93)
DES057	Manhole 13	\$ -	\$ 176.87	\$ 176.87	\$ (176.87)
DES061	Tunnel Steel Corrosion	\$ -	\$ 8,057.01	\$ 8,057.01	\$ (8,057.01)
DES073	MH 18 Condensate and Platform Exp	\$ -	\$ 12,655.73	\$ 12,655.73	\$ (12,655.73)
	Total Closed Projects	\$ 7,320,301.40	\$ 1,942.49	\$ 7,606,461.99	\$ (286,160.59)
	Project Development	\$ 866,198.60	\$ -	\$ 315,570.26	\$ 550,628.34
	Total 2005B Bond	\$ 8,186,500.00	\$ 134,128.28	\$ 8,064,218.04	\$ 132,281.96
2007 Bond Projects					
	Total Closed Projects	\$ 2,374,348.00	\$ -	\$ 2,620,770.53	\$ (246,422.53)
	Project Development	\$ 484,152.00	\$ -	\$ -	\$ 484,152.00
	Total 2007 Bond	\$ 2,858,500.00	\$ -	\$ 2,620,770.53	\$ 237,729.47
2008 Bond Projects					
DES048	Tunnel Lighting & Elec Ph III	\$ 100,000.00	\$ -	\$ -	\$ 100,000.00
DES061	Tunnel Steel Corrosion	\$ 250,000.00	\$ -	\$ 3,631.90	\$ 246,368.10
	Total Closed Projects	\$ 1,870,693.21	\$ 1,031,877.94	\$ 2,874,868.10	\$ (671,368.10)
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 187,393.20	\$ -	\$ -	\$ 187,393.20
	Total 2008 Bond	\$ 2,878,500.00	\$ 1,031,877.94	\$ 2,878,500.00	\$ 0.00
2010 Bond Projects					
DES059	CJC Steam & Cond Ser. Line Replace	\$ 150,000.00	\$ 3,063.67	\$ 3,063.67	\$ 146,936.33
DES062	Stm and Cnd Line MHK to Wildhorse	\$ 300,000.00	\$ 240,670.01	\$ 240,670.01	\$ 59,329.99
DES066	First Ave MH Abandonment	\$ -	\$ 1,396.54	\$ 1,396.54	\$ (1,396.54)
DES067	Tunnel Rock Repair	\$ 1,152,000.00	\$ 19,635.48	\$ 19,635.48	\$ 1,132,364.52
DES068	St. Mary's Cond Tempering Station	\$ 20,000.00	\$ 38,121.57	\$ 38,121.57	\$ (18,121.57)
DES069	Municipal Aux Tempering Station	\$ 25,000.00	\$ 4,326.32	\$ 4,326.32	\$ 20,673.68
DES070	MH 6 to 23 Cond Line	\$ 300,000.00	\$ 526.62	\$ 526.62	\$ 299,473.38
DES071	Hermitage Hotel Ser Modifications	\$ 125,000.00	\$ 1,119.07	\$ 1,119.07	\$ 123,880.93
DES072	Shenaton Stm & Cond Line	\$ 250,000.00	\$ 31.38	\$ 31.38	\$ 249,968.62
DES073	MH 18 Condensate and Platform Exp	\$ -	\$ 749.57	\$ 749.57	\$ (749.57)
DES075	2010 CHW Outage	\$ -	\$ -	\$ -	\$ -
DES076	MH S4A Rehabilitation	\$ -	\$ 681.55	\$ 681.55	\$ (681.55)
DES077	Music City Convention Center Design	\$ -	\$ 102,061.84	\$ 102,061.84	\$ (102,061.84)
	Total Closed Projects	\$ -	\$ -	\$ -	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 88,000.00	\$ -	\$ -	\$ 88,000.00
	Total 2010 Bond	\$ 2,410,000.00	\$ 412,383.61	\$ 412,383.61	\$ 1,997,616.39

V. Energy Distribution System Repairs, Improvements, PM and Emergencies

Several EDS repairs and improvements were made during the Fourth Quarter. The principle items for discussion are presented in the following sections.

A. Repairs and Improvements

Several repairs were made to the EDS and at customer buildings during the quarter. The items listed herein fall outside the scope of the DES Capital Projects. The remaining value of the R&I budget at the end of FY10 is \$493,424. Table 6 provides a summary of the FY10 expenditures and revenues to date associated with the R&I budget.

Table 6. Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfer	Net Market Adjustment	Market Value	Balance
"Market Value" and "Cost Value" at end of FY09						\$ (580.00)	\$ 458,943.32	\$ 458,363.32
Sub-Total First Quarter FY10				\$ 35,648.49	\$ 61,775.01	\$ (7.36)	\$ 2,6119.16	\$ 26,126.52
Sub-Total Second Quarter FY10				\$ 29,089.10	\$ 61,775.01	\$ -	\$ 32,685.91	\$ 32,685.91
Sub-Total Third Quarter FY10				\$ 76,746.90	\$ 61,775.01	\$ -	\$ (14,971.89)	\$ (14,971.89)
Constellation Energy - Period 3/1/10 - 3/31/10 (EDS Repair)	5/24/2010	DES-1178	CEPS	\$ 3,245.59				
DES Repair And Improvements, for billing period of 4/4/10 - 5/01/10	5/13/2010	DES-1165	TEG	\$ 5,655.93				
DES Repair And Improvements, for billing period of 5/2/10 - 5/29/10	6/9/2010	DES-1174	TEG	\$ 2,290.14				
Constellation Energy - Period 4/1/10 - 4/30/10 (EDS Repair)	6/11/2010	DES-1183	CEPS	\$ 2,050.18				
Constellation Energy - Chilled Water Outage - FINAL	5/26/2010	DES-1175	CEPS	\$ 31,824.75				
Constellation Energy - J.K. Folk Bldg Steam Line Drip Line Installation - FINAL	5/24/2010	DES-1176	CEPS	\$ 5,690.00				
Constellation Energy - 4th Avenue Condensate Line Repair	5/24/2010	DES-1177	CEPS	\$ 14,817.10				
Constellation Energy - 1st Avenue Steam Line Abandonment	6/14/2010	DES-1185	CEPS	\$ 5,563.60				
Sub-Total Fourth Quarter FY10				\$ 71,127.29	\$ 61,775.01	\$ -	\$ (9,352.28)	\$ (9,352.28)
FY 10 Year to Date				\$ 212,611.78	\$ 247,100.04	\$ (7.36)	\$ 493,424.22	\$ 493,424.22

B. Preventive Maintenance

Preventive maintenance, tunnel and manhole inspections and reviews of customers' mechanical rooms were performed during the quarter. The principle items for discussion are presented.

1. EDS Tunnel and Manhole Inspections
 - a. Rock continues to be in need of repair in the ceilings in the tunnels under Broadway, 4th Avenue and 7th Avenues. A Tunnel Rock Rehabilitation project that was scheduled to begin during the Fourth Quarter FY10 was delayed due to the flood in May 2010. This project will begin during the First Quarter FY11.
 - b. Some leaks were found during the quarter and continue to be monitored.
 - c. Minor repairs were made during the quarter.
2. State Tunnel Inspections
 - a. A leak was found during the quarter.

- b. The tunnel radio system is currently non-operational. State personnel have been notified.
- c. Other minor repairs were made during the quarter.
- 3. Manhole and Other EDS Inspections
 - a. The thermographic surveys performed in May and June indicate that the hot spot near the Criminal Justice Center may be getting worse. No additional hot spots were found during the quarter.
 - b. Other minor items are included in the CEPS monthly reports.

C. Emergencies

The only reported emergency during the quarter was the emergency shut-down of the steam system due to the rising flood waters on May 2.

D. EDS Walk-through

The EDS walkthrough was conducted on July 22, 2010 by Jon Belcher, P.E. of TEG. Due to ongoing projects and the flood damage repair work at Manhole L, not all of the scheduled manholes were visited prior to the writing of this report. The manholes that were visited prior to this report include Manholes A, L and M. The following comments and observations are a result of this visits:

- 1. Manhole A
 - a. There was an appreciable amount of water in the bottom of this vault. It took approximately 30 to 45 minutes to pump the water out. Water levels within this manhole have been as deep as 3 to 4 feet. TEG developed a design to install a sump pump in this manhole, along with pumps in Manholes B and M. This design was bid, and based on pricing received, this project is not financially viable at this time.
 - b. The vault entry consists of two ladders for a portion of the entry length. An extension ladder has been positioned “on top of” ladder rungs which are embedded into the concrete wall of the vault entry. The embedded ladder rungs interfere with the use of the extension ladder rungs and should be removed for safety reasons.
 - c. There is some corrosion developing on the piping supports. These supports should be wire brush cleaned and painted to prevent additional corrosion.
- 2. Manhole M
 - a. There was an appreciable amount of water in this vault, and it required over an hour to pump.

- b. There is some minor insulation repair that should be done in this vault. This includes the re-installation of an insulation blanket on a steam expansion joint and the re-installation of a small segment of jacketing.
 - c. Recently, due to leaking valves, portions of the existing chilled water piping was removed from this manhole. As a result of this, there are two sets of anchor bolts (8 bolts total) and plating that are no longer in use and protrude up from the floor presenting a potential trip hazard. These plates should be removed and the bolts should be cut even with the floor.
 - d. The link seal on the steam line penetration at the northern wall has been dislodged from the top portion of the pipe. The reason this has occurred is not clear. There is a slip type expansion joint just south of this wall penetration and it appears that the piping penetrating the wall has “lifted up” forcing the link seal from its position. If this has occurred, potential binding of the slip joint is possible. This link seal needs to be re-installed.
 - e. There is some minor corrosion of some of the structural components in this manhole. This vault should be included in the capital project to repair and prevent structural corrosion.
3. Manhole L
- a. Manhole L sustained damage resulting from the flood in May 2010. A slip type expansion joint in this manhole became bound as a result of the system being shut down for 6 days during and after the flood. The work on this manhole was being done during the quarterly EDS walkthrough.

VI. Customer Relations

This section contains descriptions of the marketing efforts made by the DES Team during the quarter. The topics of interactions, meetings and training seminars with the customers are also discussed. There are currently 27 customers, comprised of 40 different buildings, connected to the EDS. Service to each of these buildings continues to prove satisfactory, and the responsiveness to customer issues is handled by CEPS in an excellent and professional manner.

A. Marketing

TEG and Metro DES continue to monitor and remain involved with the progress associated with the development of the new Music City Convention Center (MCCC). Final design was completed during the quarter and the project was bid and awarded. Construction for this project is anticipated to begin in the First Quarter FY11.

A brief meeting and some communications have begun with engineering personnel associated with the proposed Medical Mart to be located in the place of the existing Convention Center.

B. Customer Interaction

- Several customers reported issues with either their in-building heating or cooling systems. These issues were addressed by the CEPS customer service representative (CSR). In most cases, the issues related to failed customer equipment or the improper control of the building system. Several metering or electrical issues also occurred during the quarter that affected the recording of several customers' billing data.
- The Sun Trust Bank building isolated their in-building steam system from the EDS in April for the summer. This practice is common for this customer.
- Temporary chilled water service to the Schermerhorn Symphony began in May to assist the customer in the necessary repairs and cleaning due to damage from the May flood.
- Chronic cooling problems at the Criminal Justice Center arose again as the cooling season began during the quarter. These problems have been investigated by TEG and others in the past and appear to be related to the in-building chilled water control system and operations.
- Other minor issues and customer interactions are noted in the monthly CEPS reports.

VII. Recommendations

Based on the review of the Fourth Quarter EGF and EDS operations, the following recommendations are made.

- The installation of a condensate polisher will permit the return of condensate from the distribution with high levels of iron or hardness. The current practice by CEPS is to dump the condensate to drain in the Broadway Avenue tunnel at MH-18 whenever the condensate impurities test high. Although this practice protects the boilers at the EGF, the operations incur increased costs in water, chemicals and fuel whenever the condensate is not returned. The cost of the polisher and its economic benefit to the customers will continue to be investigated. If the economic benefit is justified, the installation of the condensate polisher will be recommended.
- Safety items noted in the EDS Walk-through should to be addressed.
- Cleaning, painting, replacement and repair of structural steel within manholes to reduce or eliminate corrosion has been assigned a capital project number of DES061. Repairs began in the Fourth Quarter FY10 and will be ongoing in a similar method to the Insulation Repair Project (DES060).

- Insulation which is not present or in disrepair within the manholes should be addressed through either additional capital projects, which include work within these manholes, or through DES060.

Metro Nashville District Energy System - Flood Event May 2010

On May 1 and 2, 2010, Nashville and the middle Tennessee area experienced an extraordinary rainfall event resulting in 13 - 19 inches of rain being recorded. This large amount of rain caused the Cumberland River to rise rapidly throughout the day on Saturday May 1st and into Sunday May 2nd. CEPS employees monitored the river level and the manholes located on 1st Avenue closely. At approximately 4:00 p.m. on May 2, 2010, the river level was about five feet from spilling on to 1st Avenue near Riverfront Park. At this point, Manholes L and K were nearly full of water causing a false steam load. As a safety precaution, and in order to avoid potentially more damage, the decision was made to shutdown the steam system.

During the night, the water continued to rise, overflowing into the downtown area and filling the Energy Distribution System (EDS) Tunnels from 1st Avenue and Broadway to Station B-81 (near 6th Avenue on Broadway) and to Station 4-31 (near Commerce Street on 4th Avenue). In addition to Manholes K and L mentioned earlier, Manholes B, B2, B4 and M filled with water when the river left its banks.

Finally, on the evening of Monday May 3, 2010, the river crested at 51.86 feet and began to recede. On May 4th, CEPS personnel restored lighting to the areas of the Tunnel that did not suffer major water damage (7th Avenue and the west end of the Broadway Tunnel). CEPS I & E personnel also began ordering parts to restore the damaged lights, pumps, motors and control circuits that would be needed once the water could be removed from the tunnel. CEPS personnel continued to monitor the situation, and once the river level subsided, the process of removing the water from the EDS Tunnel began at approximately 12:30 p.m. on May 5, 2010. This continued around the clock until 4:00 p.m. May 7, 2010. An estimated 800,000 gallons of water was pumped from the EDS Tunnels back to the river.

CEPS I & E personnel repaired the Tunnel Sump Pump Control System by replacing all of the breakers, controls, floats, etc. This allowed CEPS to remove the portable pumps that were used to pump water from the tunnel and begin preparations to restore service to the steam system. At approximately 6:00 p.m. on May 7th, CEPS personnel began to bring the steam system back up slowly. This process continued over the weekend to allow the water soaked insulation to dry out and the water in the steam casings to evaporate. Following the restoration of steam service, CEPS began making repairs to other damaged systems, which are on-going. These include:

- Manhole 18 Repairs
 - Sump Pumps and Controls
 - Condensate Pumps, Motors and Controls
- Tunnel Lighting
- Tunnel Communication
- Tunnel Ventilation Fans
- Manhole Insulation
- Manhole L Repairs

Manhole 18 Repairs

This vault is located at the east end of the Broadway Tunnel. It houses the chilled water supply and return piping, steam and condensate piping, the tunnel sump pumps and related electrical equipment, the condensate storage tanks and level controls and the condensate pumps and motors as well as electrical controls. This area is approximately 40 feet below the roadway and was completely under water during the flood. The tunnel sump pump control cabinet was saved; however, all of the breakers, switches, fuses, floats etc. were replaced.

The electrical service into this manhole was replaced including the main breaker for this area. The breaker, switches, fuses and other control equipment for the three condensate pumps and motors was replaced. The three condensate pump motors were replaced along with the mechanical seals and two of the impellers for the pumps. The air bleed control valve was replaced. The condensate storage tanks level transmitters were replaced as well as the Siemens MEC which sends a signal to the plant showing tanks levels, pump operation and tunnel sump pump alarms.

Tunnel Lighting

This is located throughout the tunnel in approximately 20 foot intervals. The flood water was to the roof line of the Broadway Tunnel up to Station B-81 and on the 4th Avenue Tunnel up to Station 4-31. CEPS has currently purchased 10 light fixtures and will need from 25-40 more to completely restore the tunnel lighting to pre-flood levels.

Tunnel Communication System

This system utilized by CEPS personnel for regular inspections and repairs, as well as, contractors working on projects in the EDS Tunnel. A base station is located on the west end of the Broadway Tunnel. The “leaky feeder” cable system is fed from the base station to each section of the tunnel. Water damage to the communication system includes: the base station, repeaters, splitters and approximately 1500 feet of leaky feeder cable. (“Leaky Feeder” refers to the radio signal emitted from the cable). These repairs required the services of the manufactures representative system engineer to access the level of damage and to supervise and assist with the installation of the new equipment.

Tunnel Ventilation Fans

Tunnel ventilation fans are located on 7th Avenue and 4th Avenue. Fans damaged as a result of the flood are located in the 4th Avenue Tunnel at approximately Station 4-17. These are used to ventilate the 4th Avenue Tunnel as well as the majority of the Broadway Tunnel. There are two 30 Horsepower motors, belts, breakers, switches, fuses and transformers in this area. All of this was replaced with the exception of one 30 HP motor which was saved.

Manhole Insulation

The manholes along 1st Avenue and Molloy were filled to the top with water during the flood. These manholes are B, B2, B4, K, L, and M. Insulation repairs have not been addressed due to the higher priority areas. Repairs will be made at the earliest possible time.

Manhole L Repairs

This steam and condensate manhole is located in Riverfront Park at the flag pole turn-around. After the steam system was re-energized, it was discovered that the 18" steam expansion joint in Manhole L was over extended and bound up as a result of the flood. This condition caused the steam line anchor to fail, compressing the 20" steam expansion joint, creating a leak. After careful monitoring, the leak continued to worsen over the couple of days. Due to safety concerns, the determination was made to have an emergency steam outage. The plan was to cool the steam line enough to relieve the stress on the 18" expansion joint and jack it back in to place, anticipating it would return to functioning properly after being re-anchored.